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CARNEGIE MAGAZINE

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VOLUME XVII PITTSBURGH, PA., JUNE 1943 NUMBER 3

THE ROBBER CRAB

A Gift from the South Seas by Mr. W. L. Mellon

(*See Page 72*)

THE CARNEGIE MAGAZINE

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VOLUME XVII — NUMBER 3

JUNE 1943

Poor queen! So that thy state might be no worse,
I would my skill were subject to thy curse.
Here did she fall a tear; here, in this place,
I'll set a bank of rue, sour herb of grace.
Rue, even for ruth, here shortly shall be seen,
In the remembrance of a weeping queen.

—KING RICHARD II

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The Carnegie Institute, in the broadest sense, holds its possessions in trust for mankind and for the constant welfare and happiness of the race. Anyone, therefore, who by a gift of beautiful works of art, or objects of scientific value, or a donation to its financial resources, aids in the growth of these collections and the extension of its service is contributing substantially to the glorious mission of the Institute.

The Carnegie Institute will be the final home of every worthy collection of pictures and museum objects when the men and women who have chosen them wish to have the world enjoy them.

—ANDREW CARNEGIE

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MRS. CARNEGIE'S CONGRATULATIONS

Robert E. Doherty, President of the Carnegie Institute of Technology, has received the following letter from Mrs. Carnegie:

DEAR DR. DOHERTY:

Your most interesting letter of May the 10th has given me the greatest pleasure. I am thrilled to think of the intense programme of activities which the Carnegie Institute of Technology is carrying on, and I want you to know how much I appreciate your very kind thoughtfulness in sending me this personal letter. Although increasing years make it impossible for me to visit Pittsburgh, or to even keep apace with the many activities of the Institute, it gives me a great thrill of pleasure to know of what is going on, and I realize what a satisfaction this would have been to its Founder.

I am glad the endowment fund is making such progress.

Warmest congratulations and good wishes to Carnegie Tech under its very able leader!

With personal good wishes and kind regards,

Very sincerely yours,
LOUISE W. CARNEGIE.

BRAZIL AT NIGHT

NEW YORK CITY

TO THE EDITOR:

I was greatly interested in reading "Brazil's Leadership" in the CARNEGIE MAGAZINE of May. It brought to my mind the delightful article William S. Andrews wrote when he was at Rio, which I am enclosing. He was there on government duty. Mr. Andrews was a Carnegie alumnus, Electrical Engineering, 1923. I enjoy the Magazine so much.

—CLARA POMEROY WHITE

[Mr. Andrews' article is reprinted on the opposite page.]

BLOOD DONORS

The staff of the Carnegie Institute have volunteered to donate their blood almost unanimously, and they are making daily visits to the American Red Cross headquarters for this purpose.

MUSIC AND DRAMA

When Mr. Carnegie established the Carnegie United Kingdom Trust for Great Britain, he stipulated that music and the drama should be encouraged. Under this partial aid the orchestras and opera companies, both professional and amateur, have been greatly helped in their constant work.

WHERE ARE THE GREAT MINDS?

Behold, my son, with how little wisdom the world is governed.

—OXENSTIERN (1583-1654)

THE HARBOR OF RIO DE JANEIRO BY NIGHT

[The article on "Brazil's Leadership" in the CARNEGIE MAGAZINE for May has brought to our attention the following interesting description of a ship's sailing from the harbor of Rio de Janeiro written by William S. Andrews, a graduate of the Carnegie Institute of Technology in the engineering class of 1923. A World War veteran, Mr. Andrews died in July 1941, after a long illness. Miss Clara Pomeroy White has endowed a scholarship for the Carnegie Tech Endowment Fund in his memory.]

I HAVE just learned from the Captain—in sea slang, I should say "the old man"—of this tramp steamer, the Santa Rosalia, to which I've been assigned as "Marconi," that this is to be my last night in Rio; so here I am, writing this while leaning against one of the stanchions on the poop deck. I have come aft here just at sunset, to haul down the old "stars and stripes," in whose shadow I now stand, and to watch the night fall over this wonderful city.

Behind me, the deafening rattle of the donkey engines has stopped, the hoisting booms are all in their blocks, and the tackle is being coiled for stowing away; the "cargoedores" have gone off in their lighters, towed away by a wheezing old tug. The sun is beginning to lose its white brilliance and is slowly turning to a copper color, now quite yellow, but gradually becoming more red—until at present it is a wonderful ruby color. It poises for a minute on the very ridge of the mountains in the west, looks forth in all its splendor, and slowly sinks to rest behind them, while I reverently take in the flag, fold it, and put it away. I turn again, and on seeing the wealth of color displayed in the sky that the sun has just left, I am simply held spellbound. A never to be forgotten sight—the dying day. Over the very spot where I had last seen the blood-red ball, there now appears the gorgeous ruby hue that blends and loses itself in the fleecy tumbling clouds, and is shot back and upwards into the shades of red—the garnet, the carmine, the rose-red, the pink. These are ever changing colors. Even as I write, new shades appear; in truth, I find no words to describe them, and I believe none ever will be found to describe such a sight. The shades of red are mingled with orange, bright yellow, topaz, and faint greenish-yellow. Splotches of purple and rose lavender appear on the downy edges of the clouds. The color holds for a bare moment, and then vanishes, leaving the clouds a lifeless gray. It seems as though heavy leaden-colored curtains, closely followed by black ones, are being swiftly drawn across the entire sky. A tropical night falls quickly. While gazing at such a spectacle, I had quite forgotten all that had taken place around me.

I am suddenly made aware of the time by hearing four bells struck on a Brazilian battle cruiser that is at anchor just astern of us. Other ships about us also give out the same quick notes. A short bugle call stridently sounds from the cruiser, evidently a call for mess. A light warm breeze, which is blowing toward me, carries all sorts of sounds, from that of a passing steamer's deep roaring whistle, to the steady lap of the water against the bulky stern of our own vessel. The shrill piping whistle of a tug, blowing for a clear way through the maze of anchored ships, comes freshly to my ears. That tug must be coming to us. Sure enough: "The pilot is coming aboard," I hear someone say, which means we would be moving shortly. I see the dim outlines of the pilot, the "old man," and first mate Evans, on the navigating bridge. The "stand-by" to the engine room has just been given, and back

here I can feel the tremor that the steam winches make as they steadily haul up the anchor. The air is noisy with the sharp sounds of commands, the steady grind of the winches, and the clanking rattle of the heavy chains, as they seem to saw up through the hawser holes. Everybody is noisily busy on the fo'castle head and bridge, while aft here on the poop, I am quite set apart from all that bustle ahead. The "go ahead slowly" signal rings out, and the massive propeller under me begins to turn and churn up great volumes of hissing foaming water, which is pulled from the depths, thrown over, and thrust back to form a rippled phosphorescent wake. We are moving steadily ahead, and turning to get into the channel and streamway leading to the open sea. It will take us some little time to get out, for the harbor is such a big one. I want to get one last look at Rio, as we move down the channel.

We are passing through the principal anchorage for merchant vessels. It seems very quiet on board most of them, and few lights, beside the required two at mastheads, can be seen. The familiar sound of the old German street band breaks pleasingly upon my ear: it comes from one of the interned German ships on our port side. Farther on, we pass many Brazilian battleships and destroyers. The "men o' war" are gaily lighted up, and hardly impress one as being very formidable, in spite of their bulkiness. Innumerable small boats, most of them miniature steam yachts, come and go in all directions. All carry a red light on their port side and a green one on their starboard. Adhering to the maritime law that red must pass red, accidents rarely occur. These moving rays throw thin ribbons of light that shimmer and gleam and intermingle on the water as they span the distance to where I'm standing. Many of the ribbons lead far across to the shore. The regularly spaced white lights along the sea wall of the Avenida Beira-Mar have a tenuouslike form, which stretches along the entire city water front. It is too far away to distinguish people, but moving lights of street cars and automobiles, as they pass and repass on the drive, indicate activity on shore. The irregular yellow lights denote houses. Ashore, that slowly moving spot of light, which is suspended so far above the harbor level, comes from a small car that is being pulled up on a set of cables, stretching from the ground to the summit of the world-famous Sugar Loaf Mountain. The throbbing movement of the ships that we had heard on all sides has gradually subsided, and sounds diminish as we increase our distance. The noise of our engines and propeller is greater, as we are now well under way. A flaring crimson light flashes steadily for a few minutes from the starboard side of the bridge; it is held by one of the officers. A deep sullen report of a cannon is heard, and the flash can be detected to come from that dark patch about a half a mile to the starboard. The dark patch is a naval fortress, and has given us the signal that we may "clear" port. We are leaving the myriads of flashing lights far astern now, and out here in the dark open sea, where the ship has already caught the roll, we swing to the northward almost regretfully, and I remain on deck long enough to see the bright reflection of the lights of Rio, in the southwesterly sky, grow fainter and fainter, and gradually descend below the rim of the sea.

TRUE LEADERSHIP

It is to him who masters our minds by the force of truth, not to those who enslave men by violence; it is to him who understands the universe, not to those who disfigure it, that we owe our reverence.

—VOLTAIRE

VALUE OF SELF-REPROACH

Never can I forget what I owe to six words from that great teacher, Burns, which fortunately burnt themselves into my conscience in youth and remain with me in old age: "Thine own reproach alone do fear."

—ANDREW CARNEGIE

THE SUMMER SHOW

The Carnegie Institute Presents Pittsburgh Artists

THE CARNEGIE INSTITUTE presents three exhibitions of paintings, during the year, devoted exclusively to the work of Pittsburgh artists. The first is the annual exhibition of the Associated Artists of Pittsburgh. This, it is true, is held under the auspices of the Association, but with the co-operation of the Institute. The paintings are chosen by a jury, and the exhibition is made up of some two hundred and fifty oil paintings, numerous water colors, sculpture, drawings, and applied art works. It gives a very broad and extensive survey of the state of art in this community. The second show is the one-man exhibition by a Pittsburgh artist. Each year an artist is nominated by the Institute, and the show is entirely under its egis. The idea is to honor an outstanding artist of the community and to cover his whole painting career. The third show given over exclusively to local art is different in its organization and presentation. It is the exhibition of paintings by Pittsburgh artists which has come to be known more popularly as the "Summer Show."

The tenth annual show of this type opened in Galleries E and F on June 10 and will continue through August 1. The exhibitors were selected by the staff of the Department of Fine Arts and were invited to send two paintings each. The artists are chosen for inclusion largely on their representation in the annual exhibition of the Associated Artists. This year, as in the past, the artists invited were limited to those who live within the boundaries of Allegheny County.

It is the aim of the Department of Fine Arts to present, in a conveniently small and selected group, paintings by those whose creative work has seemed, in the opinion of the staff, to be outstanding during the current year. It is an event which is looked forward to with a great deal of interest by painters themselves, as well as by visitors to the galleries interested in a synopsis of the work being done in their locality. Here one may study the latest developments in the progress of an established painter, acquaint oneself with the work of new artist members of the community, or view the beginnings of recently discovered and promising talents. The record demonstrates that though the show is selective, it has throughout the years given a remarkably thorough presentation of the works of distinguished artists in this vicinity. Over the ten-year period ninety-one artists have been presented, and, generally speaking, the list of their names reads like a Who's Who in the art of the region. Since the beginning of the show, an average of eight new names have been added each

GREEN SWAN
BY JOHANNA K. W. HAILMAN

ALL IS FAIR . . .? BY PAUL KARLEN

year. Thus the exhibition changes and grows along with the general pattern of art development in the district, and visitors to the show may have a concentrated picture of what is going on in the field in any given year.

The first "Summer Show" was held in 1932 when fifty-two paintings, the work of eighteen artists, were presented. It was not resumed until 1935, when fifty-two paintings by twenty-six artists were shown. The following year twenty-five artists exhibited, in all, forty-seven paintings. In 1937 there were fifty-six canvases in the show, twenty-nine artists being represented. In 1938 the exhibition comprised forty-nine paintings by twenty-six artists. There were fifty-five paintings illustrating the work of twenty-nine artists in 1939 and fifty-one paintings by twenty-eight artists in 1940. The 1941 exhibition included fifty-six canvases by thirty artists. The largest show of this kind was given last year, when sixty-four paintings were hung and thirty-four artists were represented. This year the Institute presents thirty-two artists showing a total of sixty-two canvases. The exhibitors are as follows: L. W. Blanchard, Clarence H. Carter, Marty Lewis Cornelius, Esther Topp Edmonds, C. Kermit Ewing, Frederick S. Franck, Everett Glasgow, Marian Graper, Balcomb Greene, Johanna K. W. Hailman, Caroline P. Haney, Earl B. Holdren, Margaret Edmonds Jensen, Paul Karlen, Robert L. Lepper, R. D. Long, Norwood MacGilvary, Carolin McCreary, E. Arnold Nussbaum, Louise Pershing, Milan Petrovits, Wilfred A. Readio, Samuel Rosenberg, Raymond Simboli, Rachel McClelland Sutton, Frank A. Trapp, Russell G. Twiggs, Ottmar F. von Fuehrer, Abe Weiner, Milton Weiss, Lloyd Weninger, and Richard E. Williams. Eight people new to this particular exhibition are included—L. W. Blanchard, C. Kermit Ewing, Marian Graper, Balcomb Greene, Caroline P. Haney, R. D. Long, Milton Weiss, and Lloyd Weninger. It should be stated that a number of names are omitted

from the show because the artists are in military service. The people who have been represented previously and no doubt would have participated in 1943, had they not been engaged in the service of their country, are: Eileen Bible, James J. Fisher, John Kucera, Thomas R. Lias, Clarence McWilliams, Sidney Simon, Charles Smehyl, Alan Thompson, Sidney J. Navratil, and Frances Wright. It should also be noted that two artists in this year's exhibition are now in the service, Frank A. Trapp and Richard E. Williams.

In viewing the exhibition, one may be surprised that the paintings reflect so little of the violence in the world today. There are only two canvases in the show which even remotely refer to war. The one is "All is fair. . . .?" by Paul Karlen, and the other, "Victory Garden" by Everett Glasgow, which has but an indirect relation to the troublesome times in which we live. The absence of this motif in painting is not unusual and has been noted in exhibitions elsewhere. It has been said that for the most part the American artist is making use of the same subjects he has always used. Subjects which formerly interested him are no less exciting and no less suitable as pictorial matter because we are engaged in a great struggle. Perhaps the artist, in his detached view of the world, realizes that as for the conflict, "This too shall pass away," and that, after all, a bit of landscape, an arrangement of flowers, the face of a friend, an abstraction, or memories of the past are the only real and stable things that are worth recording. And if the artist thus finds in his work relief and an escape from overcrowding events in depicting the changeless aspects of nature and life, he satisfies the same need in all who observe his paintings and provides for them, too, a quiet place and a retreat from the restless and uneasy world.

The "Summer Show" this year is a particularly colorful one: color rich and unusual abounds. It contains all schools of painting, including five abstracts that add no little interest, an intriguing quality, and variety to it. One of the noteworthy features is the emphasis on good painting in most of the canvases. There is a balanced distribution of landscapes, portraits, and figure, still life and flower pieces. It gives a good account of the work of a selected group of Pittsburgh artists in the year 1943. J. O'C. Jr.

CARNEGIE MUSEUM SUMMER EXPLORATIONS

Due to the exigencies of the war effort, there are fewer summer explorations this year than ever before. Many of the men have already entered the armed services, and those who are remaining at home, with a few exceptions, have neither the facilities nor the opportunities for scientific travel.

Through the kindness and generosity of a constant friend of the Museum, however, J. LeRoy Kay, curator of vertebrate paleontology, assisted by J. Kenneth Doutt, curator of mammalogy, have been enabled to go on an expedition to the West to continue the paleontological research for which the Carnegie Museum has been famous since its inception. It has been planned that the field party will spend at least three months in continuing the work in southwest Montana that the Museum has conducted during the past few years. The mapping of the fossil deposits found in the Tertiary formations, from which collections have been made, will be finished this year, and will supplement other maps printed formerly in the Carnegie Museum Annals.

E. R. Eller, assistant in vertebrate paleontology, has returned to his research studies of scolecodonts, or worm jaws, in New York State and southern Canada, which he has carried on during recent summers. As in previous years, Mr. Eller has had the co-operation of a grant from other scientific organizations to help him in the continuation of this work.

WHAT OUR SOLDIERS SEE

An Exhibition at the Carnegie Museum Interprets a Region of Strategic Importance in the War

In the current world of events the Pacific area is a theater of dramatic developments of prime importance, and public attention is naturally centered upon it. Since this region, which is so remote from the former scope of national American interest, has become of such vital concern in the global war of today, the Carnegie Museum has chosen this opportune time to place on view a temporary exhibition illustrating some of the features that are characteristic of the natural conditions and the native tribes of this war theater. While the exhibition will prove of especial interest to the relatives of those men who are engaged in the Battle of the Pacific, as instructive of the people and the natural conditions surrounding our fighting forces on the antipodal side of the globe, it will also hold enjoyment for all those people in Pittsburgh who are vitally engaged in furthering the war effort, soldiers as well as civilians. It gives a new and deeper insight into the pleasant and unpleasant things with which the soldier must deal and contend.

Included in the exhibition are actual examples of the native arts and crafts of the peoples of the Pacific, amplified by four schematic and pictorial maps that show the distribution of the human races and their traditions in the fields of economy, arts, and flora and fauna. Various primitive weapons, utensils, artifacts—samples of primitive art—and typical products are shown, depicting particularly the use of the rich natural resources of the South Sea Islands. There are four examples of tapa cloth in native designs on the columns above the cases, a fabric which is made by the steeping and beating of the bark of the paper mulberry tree. This cloth is used for mats, hangings, and other decorative purposes by the natives of the Islands.

An assortment of specimens from the Herbarium has also been assembled to illustrate the economic significance of: the rubber plants; the cassava, the roots of which are eaten like the sweet potato or dried to make tapioca; the betelnut—used for tobacco; the sago palm, from which starch is made by pounding under water; rice, which is the only cereal raised in the South Seas; the coconut tree, which furnishes food, clothing, and building material for the natives; as well as copra, the dried meat of the coconut, which contains coconut oil and is an important export; the breadfruit that is baked and eaten by the natives; taro, of which both the leaves and roots are eaten; and other valuable plants cultivated in the tropics. The map showing the flora and fauna of the Pacific is highly colorful, as are the large wall paintings that are mounted above the exhibit.

These paintings, which emphasize, in such a fresh and brilliant manner, the objects in the display, aid considerably in the visual knowledge attained from the specimens in the cases. Done especially for this purpose by the Carnegie Museum staff artist Ottmar von Fuehrer, they lend themselves concretely to an understanding of the Pacific area. To illustrate their tie-up with the objects below them, an example may be cited of the robber crab, which is portrayed on the cover of this Magazine. The wall painting over the cases containing this tree-climbing crustacean, which is found only in the South Seas, is a bright portrayal of the coconut trees from which the robber crab has procured the food he is devouring in the diorama. This species is the only animal known, other than

man, who possesses both the skill and the strength to open the smooth hard fruit of the coconut palm, which is often as large as a football. Nourished on this fare, the flesh of these crabs is a much desired delicacy among the natives. The Museum is indebted to Mr. W. L. Mellon, a trustee of the Institute, for these specimens which he brought back from a "Vagabondia" cruise.

Above the case containing the coral reef is a picture of a sandy beach such as one may see along the Australian coast. From this beach, with the blue sky above, and the palm trees in the distance, the coral reef may be seen in all its gorgeous color. The pictorial map painting that is hung above the case containing the birds of the Solomon Islands and of Guadalcanal is most helpful for visualizing the avifauna of the Islands and certain distributional data. Opposite this map is one portraying the brilliant Paradise birds of New Guinea.

The examples of birds from the Solomons—of which Guadalcanal is one island, the insects from that region and the north of Australia, and the oceanic and Solomon Islands shells on display, all typify a region that shows marked traits of biological isolation and preservation of archaic forms. Australia, although the smallest of the continents, is a veritable zoological treasure trove, characterized by a variety of primitive marsupial mammals. Peculiarities of its fauna, shared in some respects by Tasmania, New Zealand, New Guinea, and lesser islands, make a study of its fauna actually a glimpse into the great menagerie of past ages. Scientists explain these archaic forms by theories of imaginary land bridges, barriers of open water, remnants of much wider distribution, and so on. To the layman, however, they will be of special interest and speak for themselves because of their original locale and their brilliant colors and diverse sizes. The large, extremely beautiful, butterflies and birds must make the islands a paradise in times when men are able to enjoy them, without the travail of war to keep them from seeing these beauties of nature.

The Carnegie Library has co-operated in the exhibition by lending a collection of up-to-the-minute books that have their setting in these islands of the Pacific. Arranged in three groups—American Forces in the Pacific, Lands Down Under, and Japanese Aims in the Pacific—the books are on a variety of subjects, with such titles included as "I Heard the Anzacs Singing," by Macpherson, Abend's "Japan Unmasked," Caroline Mytinger's "Headhunting in the Solomon Islands," Clark Lee's "They Call It Pacific," and Richard Tregaskis' "Guadalcanal Diary." This selection of current literature, all of which may be borrowed from the Library for home reading, will certainly help the visitor to become better acquainted with the Pacific world and its problems.

The material for this attractive exhibition, other than the books, was selected and supplied by the curators and staff members of the various sections of the Carnegie Museum and was arranged for display by John Link. Exhibitions of natural history specimens indigenous to other areas of special interest in the light of current events, and interpreting them for Pittsburghers in a similar manner, will follow this present display.

DRAWINGS ON EXHIBITION

Two groups of drawings are now on exhibition in the Carnegie Institute galleries. One is a collection of "Drawings by Old Masters," a gift of the late Herbert DuPuy to the Department of Fine Arts and now a part of the permanent Institute collection.

The other exhibition is a group of "Drawings by Childe Hassam," which includes examples from the Carnegie Institute collection of the work of this American artist.

Both exhibitions will be on view until June 30.

ALUMINUM GOES TO WAR

Address Before the Carnegie Tech Alumni

By Thomas D. Jolly

Vice President, Aluminum Company of America

I am speaking to you tonight as just another engineer, the kind that Carnegie Tech turns out by the droves, who is given a job to perform and who knows what that job entails. If I am to have any credit at all for being a "man of great eminence," as I have been introduced to you, I should get it for being able to pick an organization that is capable enough to do my work for me, so that, in these parlous times, I still have enough leisure left to ride my hobby—and I don't mean in the literal sense. I am proud of my organization, consisting of men in many walks of life—I don't limit it to engineers—who are doing a job of an importance little realized by the nation. I come to you then, not as a vice president of the Aluminum Company of America, not as an engineer, not as a director of purchases, but merely as a reporter for the divisions under me, and I would like to give an account of the things these divisions have accomplished to give our country the aluminum it needs for its war program at this most critical time in our history.

Under present conditions, most of us have our noses so firmly pressed against our own grindstones that our range of vision doesn't extend much beyond our jobs. For our sake, I am glad that this is so, for we have been given a task to do—to get as much aluminum as possible as soon as possible, so that our men at the front won't be let down in their fight for freedom. We men on the production line are interested in only one thing: we want to get the tools of war into the hands of those who use them in the quickest possible time. I cannot speak for all industry, but I can give you a picture of what has happened in the aluminum industry.

Neither can I speak for the entire aluminum industry. I want to acquaint you with the happenings in our own particular company. Two months after the Munich Conference of 1938, the company initiated a study of its ability to meet any demand that might come from Britain or France, should war suddenly break out. A six-man committee, representing various departments in the company, was appointed to make frequent reports to the management as conditions changed through 1939. Based on these reports, the company inaugurated an expansion program which, with the additions since made to it, calls for a capital expenditure of about $250,000,000 of the company's money. The reports, incidentally, disregarded both the large stock of aluminum then on hand and the apparently small requirements of our own armed forces at that time.

On February 12, 1940, the Russo-German economic treaty was signed, and on March 8 we started construction of a plant to produce 30,000,000 pounds of aluminum ingot a year. A month later, Germany invaded Denmark; and on April 16, 1940, we decided to increase our new plant to 60,000,000 pounds capacity.

On September 1, 1940, our National Guard units mobilized, and on September 3 the Navy Department announced the transfer of fifty United States overage destroyers to Britain in exchange for air bases. Eleven days later the compulsory draft bill was passed. With the United States embarked on a defense program, our company again increased the size of the new plant—this time to an annual capacity of 160,000,000 pounds. I might remark here that this one plant

was geared to a capacity exceeding the capacity of the entire nation in 1924.

Other aluminum metal-producing plants were expanded to the limit of the power available, and two new hydroelectric power developments were started. Mining operations, ore refining and fabricating facilities kept pace with these increases and continued to expand as the defense program developed. But both the funds and the credit of any privately owned industry are limited, and by midsummer of 1941 it was quite obvious that no one company could finance the costs of the country's aluminum war program.

As a result, our company signed a contract on August 19, 1941, with the Defense Plant Corporation to design and construct at cost, without fee or profit to the company, one ore-refining plant and three aluminum metal-producing plants. By a supplemental agreement a few months later, we were commissioned to build two additional metal-producing plants.

Months before any contracts were signed, we became convinced in our own minds that these additional government plants would have to be built, and that we would have to build some of them. We accordingly obligated the company for something over $16,000,000 worth of equipment to be used in their construction. We took this chance because it would speed production and would save the country many weeks of priceless time, and speed the day when the sinister powers of the Axis would be crushed forever. We are proud that we took this chance: all these metal-producing plants were in operation in less than one year.

Censorship does not permit me to disclose the type or capacity of the new plants, but I can say that we are building for the Defense Plant Corporation a total of twenty-one plants that are located in fourteen states. With our own program, this gives us a total of forty-one major projects now under way, and brings our total acreage of floor space put under roof since January 1, 1940, to more than 600 acres.

So far we have placed more than 250 subcontracts for the Defense Plant Corporation, only 48 of which were negotiated. We obtained nearly 900 bids for the competitively awarded contracts, and of course, there are still quite a few not closed. We have about 17,000 men engaged directly on construction and have placed more than 35,000 purchase orders. More men and more contracts will be added before the program is completed. This gigantic task was accomplished without undue fuss by the smoothly clicking organization we have put in charge of the program. The country is aiming at an eventual production of 2,100,000,000 pounds of aluminum annually—to be achieved in less than a year from now—a production that is seven times the size of the peak peacetime years of 1937, 1938, and 1939. Each of several of the new plants will produce more aluminum than the entire nation made at its World War I peak—and still there won't be a pound left over for the pots and pans, the washing machines and the vacuum sweepers, the hair curlers and the giftware through which civilians became acquainted with the light, silvery metal known as aluminum.

How much is 2,100,000,000 pounds of aluminum? It is enough to put a thirty-piece cooking utensil set into every one of America's 34,000,000 homes, with enough left over to make 5,000,000 miles of aluminum transmission cable of the type used a few years ago for the rural electrification of America. It could be used to make the pistons and cylinder heads of 46,000,000 1935 Fords, or it could be used to rebuild every railroad passenger car in the United States every four months. It is very difficult to tell you in graphic numbers just how big this huge pile of aluminum is, and if I fail, it is because of the magnitude of the figure involved.

It might help you to understand the problems of our company in furnishing its share of the 2,100,000,000 pounds if

I briefly review the processes employed in the production of aluminum. Aluminum, as you know, never occurs in nature as aluminum. It is only found in tightly locked complex chemical compounds, and there is quite a bit of preliminary work necessary before we can obtain aluminum. If the ladies will bear with me for a moment, I should like to recall the memories of the technical men present to the manner in which aluminum is made.

Normally, we start with a mineral called bauxite, which contains fifty-five per cent aluminum oxide and less than seven per cent silica. The silica content is objectionable, and should be as low as possible for successful reduction operations. But under present conditions we are often forced to use lower-grade ores. This makes the reduction of aluminum that much more difficult.

THOMAS D. JOLLY

The bauxite is ground into a fine powder and digested in a hot caustic solution, from which aluminum hydrate is dissolved and precipitated. This is then washed, to remove soda, thickened, then calcined and shipped to our reduction plants as alumina. This ore-refining process requires large quantities of pure water, steam, soda ash, and lime, as well as two pounds of high-grade bauxite for each pound of alumina produced.

The alumina, or aluminum oxide, is a whitish powder looking somewhat like sugar. It is reduced to metallic aluminum in long rows of electrolytic cells located in the metal-producing plants. Each cell consists of a steel shell lined with carbon, which serves as the cathode. Electricity is led into each cell through carbon anodes suspended above the cells on overhead bus bars.

Cryolite, a mineral found in commercial quantities only in faraway Greenland, is then placed into the cell, and the electric current turned on. The cryolite melts and becomes fluid. Into this bath the aluminum oxide is placed, to be decomposed by the passage of the electric current. Incidentally, we have facilities in this country for making a synthetic material which is the chemical equivalent of natural cryolite, and we can use either in the production of aluminum. Therefore, our supply of cryolite is not dependent upon Greenland or upon the whims of a German submarine commander.

The low voltage direct current separates the aluminum oxide into aluminum and oxygen. The oxygen liberated during the reaction combines with the carbon anode to form gas, which escapes, while the aluminum is deposited in the bottom of the cell, where it remains as a molten layer until it is tapped off. When the bath becomes exhausted in aluminum oxide, more is added and the cycle of operation is repeated.

In the production of one pound of aluminum, two pounds of aluminum oxide—made from four pounds of bauxite—are consumed. In addition, ten kilowatt hours of electricity is required to separate the aluminum from

the oxygen, and three-quarters of a pound of carbon electrode is burned. In fact, if we take into consideration all the materials used in the different steps, from the mining of the ore to the manufacture of metallic aluminum, it will be found that nine pounds of raw material is required to make one pound of aluminum from high-grade ore. The lower grades of bauxite require not only more ore, but also additional amounts of the other materials.

Carbon electrodes are an important item. They are made by forming a hot mixture of coal-tar pitch and calcined petroleum coke in molds under hydraulic pressure. These electrodes must then be baked to remove the volatiles from the binding material, and, after cleaning, they are ready for use. The quantities of carbon electrodes consumed in the aluminum industry are so large that it is necessary to provide facilities for their manufacture to supply the metal-producing plants. In other words, each metal-producing plant has its own carbon plant.

I mentioned a minute ago that it takes ten kilowatt hours of electricity to make one pound of aluminum. That makes electricity a major item in any aluminum program; particularly now, when the country is producing aluminum at the rate of 2,100,000,000 pounds a year, the aluminum industry in one day will draw more electrical current than a city of 60,000 homes consumes in one year.

This large amount of electricity means considerable planning and investment in power development. Electrical power for the aluminum industry comes at present from three sources: (1) company-owned hydroelectric plants; (2) government owned hydroelectric plants; and (3) from steam and hydroelectric plants of privately owned public utilities.

Our own company has a large investment in hydro plants. For every dollar we have in plant and equipment at our large Tennessee works, there is another dollar invested in the mountains in hydro plants. In addition, we are drawing from TVA there as well.

Under normal conditions, we try to obtain power as cheaply as possible. We usually locate aluminum plants in sparsely settled areas, where a plentiful supply of power is available at low prices because there are few, if any, customers. But the present war program won't wait for us to build dams and powerhouses in such areas, and then wait months until the lakes behind the dams are filled with the water that will turn the turbines that will make the power. We haven't the time for this. Under present conditions, there is a greater amount of power available in large metropolitan districts than anywhere else, and it is to these districts that we turned to find the power we need. The largest metal-producing plant in the country is now under construction in one of our largest cities. The power we obtain there is not as cheap as that we could have obtained in the hills—but we can get it quicker, and that is all that counts these days.

Now a word about the general expansion program of our company. We found that it was cheaper and quicker to expand existing plants, and, where possible, to build new plants near old ones in order to utilize the supervision and experience of our existing personnel in developing new operating organizations. Before we started building for the government, we decided it would be necessary to standardize buildings and equipment as much as possible in order to complete our construction and obtain production as soon as possible. This has paid big dividends, not only on our work, but has spread out and benefited many people who never heard of us. For example, we purchased 175 cranes, all of the same span and capacity, from one crane manufacturer. This large order enabled the manufacturer to set up a production line system, and he claimed to have achieved 50 per cent more efficiency than if he had had the shop filled

with miscellaneous-specification cranes.

In another instance, we built 72 buildings from the same shop drawings, thus actually erecting plants by mass production! We made use of every short cut we could think of. One interesting feature in the new aluminum-producing plants is the new war type bus bar. Copper, the traditional material from which bus bar is made, is now so scarce that peacetime economics have been suspended. Silver is plentiful, however, and the United States Treasury arranged to lend-lease some of the silver now in its vaults. Altogether, we are using over 14,000 tons, which is a most unusual way to speak of silver. At the Government's purchasing price, this costs, in ingot form, about $290,000,000. After the war, this bus will be returned to the Treasury, to be replaced by copper. The silver bus bars, already fabricated, are now being installed. They will be under heavy guard, and no one will be allowed to take home a sample.

The only reason we were able to do so much so soon is a story which, because of the time, I can only dwell on briefly. I will say, though, that we could never have achieved our objective without smoothly-functioning organization, organization that would correlate the efforts of the purchasing, engineering, construction, reduction, and fabricating divisions, organization that would bring about the construction and operation of these two-score projects in a speedy and orderly manner.

Before closing, I might mention the fact that it is generally considered that the airplane program takes the entire present output of aluminum. That statement is true, to a large extent, but there are countless other uses for aluminum in war. There are the cooking utensils for the army and navy, the pipe berths and lockers, the lighting fixtures and the chairs, the structural shapes and the cabinets, the doors and the fittings of modern battleships. There are the pistons for jeeps, command cars, tanks, trucks, weapon carriers, tank destroyers, and other mobile units of the army; there are the pontoon boats and the outboard motors and the portable trestles of the engineers; there are the machine gun tripods, the searchlight housings and bases, the cases and antennae of the walkie-talkies; there are the fuse caps, powder containers, and detonators of shells. Nylon is used for parachutes, and nylon must be made on aluminum equipment.

I could go on and on, but the examples just mentioned will go to show you how important aluminum is, quite apart from its essential use in aviation.

In the enormous job of providing the aluminum for these manifold uses, we proudly state that so far we have not been behind schedule, and have actually been ahead of schedule in a number of cases. No organization the size of ours could have handled this work without the co-operation of everyone connected with it. Engineering, purchasing, construction, operating, co-ordinating, and priority divisions all feel that it is their job. Everyone from the blueprint boy on up is anxious to see that the schedules are kept, and, where possible, beaten. They had the job of spending more than $700,000,000 wisely, quickly, and effectively; and it is due to their efforts that there is no shortage of aluminum for the present military program.

This is our war every bit as much as it is the war of those brave men on Bataan, in the Solomons, and now in Northern Africa. We know that this war of ours can't be won on the home front—merely breaking production records won't do it—it can be won on the battle line and nowhere else. But it can be lost if we—who remain at home—fail to produce sufficient goods to meet every requirement.

Every person in industry should feel that he is a soldier of the production line, and his one purpose in life should be to see to it that his comrades at the front get all the tools of war they need when they need them.

THE GARDEN OF GOLD

JASON the Gardener—who is very practically engaged in the search for the Golden Fleece—had just begun to worry himself as to whether the anxieties of the war and the purse encroachments of taxes would cause a stoppage of the flow of gold into his hands, when the postman, never finding it necessary to ring twice, brought him letters with financial contents that quickly raised his hopes to the highest point.

The enterprise which is centered within the Garden of Gold can always count upon a word of interpretation in this department of the CARNEGIE MAGAZINE. During Mr. Carnegie's lifetime, he met every suggestion of his trustees concerning the development of his three institutions here with unexampled generosity, and the very real joy of giving was ever the chief expression of his face. Sometimes he would say: "If you can tell me how you can use a million dollars—two million dollars—wisely, you will make me the happiest of men!" And this was the spirit in which these great creations grew into their fulness of life.

When Mr. Carnegie passed away, the Carnegie Corporation of New York, which had become the custodian of his wealth, proposed to make a series of appropriations which would mark the completion of his purposes at Pittsburgh. This was in 1921, when they gave $2,444,000 to the Carnegie Institute and more than $8,000,000 to the Carnegie Institute of Technology, assuming beyond that an obligation to pay an additional gift of $8,000,000 on condition that his trustees, by the end of twenty-five years, or at June 30, 1946, would obtain $4,000,000 from the community of Pittsburgh, thus creating an endowment fund of $12,000,000 toward the expansion of that great school.

It seemed only necessary, in order to start the golden stream, to suggest to the people of Pittsburgh that in twenty-five years this great gift of $4,000,000 from them would surely realize itself. In a short time it was thought that a monthly publication would be worth while in order to promote this enterprise, and the CARNEGIE MAGAZINE grew out of that belief. And up to now nearly $2,000,000 of the $4,000,000 has been donated.

This month the first gift comes from "an old student of the engineering school," who wishes his name withheld. His check is for $2,000, and is a further contribution toward the William E. Mott Scholarship Fund—a memorial to the former Dean of the School of Engineering, which is to be used for scholarships for sons and daughters of alumni—and is credited to the Carnegie Tech Endowment Fund. This sum will be worth $6,000 in 1946.

At the May commencement of the Carnegie Institute of Technology a stirring address was delivered by Dr. Herbert Lincoln Spencer, President of the Pennsylvania College for Women, who commented gratefully on that occasion that both he and Mrs. Spencer were graduates of Carnegie Tech. As soon as he reached home there came a gift of $250 in government bonds in the name of Dr. and Mrs. Spencer for Tech's endowment, a gift which grows immediately in value to $750.

Seldom a month goes by in the report to readers of the progress of this 1946 Endowment Fund that there is no mention of the Chemistry Research Fund, one of the scholarship and memorial funds established by the alumni of Carnegie Tech. This fund was founded in 1938 by alumni of the chemistry department to extend facilities for pure research in this scientific field. It is the richer this month by a gift of $50, sent in by Thomas F. Brastow; by another

gift of $6 from the Mellon Institute of Industrial Research; as well as by anonymous gifts totaling $248.22.

On another page of this issue of the CARNEGIE MAGAZINE will be found an article by William S. Andrews, an alumnus of the College of Engineering, in whose memory Clara Pomeroy White, of New York City, very generously began a scholarship fund under the 1946 Endowment Fund. Miss White has sent in an additional $50 to the Andrews Memorial Fund, which will have a future two-for-one value of $150.

Alumni contributions have been coming in to the Gardener thick and fast. The sum of $352 has been contributed by the following: Charles H. Anderson Sr., Harold B. Applegate, Charles E. Beedle, Everett H. Bickley, Andrew Bowland, Henry L. Bunker Jr., E. W. Drensen, John H. Ferguson, Mrs. W. F. Flaherty, Belknap Freeman, Margaret M. Geyer, John M. Groves, Joseph A. Heilman, Lucile M. Kuehneisen, Charles C. Kalten, Anthony J. Kerin, Mrs. Francis H. Lang, Otis E. Leslie, Norman W. Lindsay, Cecelia Murdoch, Charlotte Parmley, Clarence R. Rupp, Dorothy D. Savage, L. S. Schweitzer, Ambrose C. Sedlachek, A. Smith, William Henry Venable, Mrs. S. N. Wagner Jr., Harry O. Waechter, and Jerome H. Waxman; and to this there is to be added an anonymous gift of $40. These gifts represent the faith, loyalty, generosity, and gratitude of the alumni, and they represent, too, a chance for someone else to receive the same training that the alumni prize so highly—an education at Carnegie Tech.

Adding all these gifts together and the sums totaled and acknowledged in the Garden of Gold for May 1943, brings the total of cash gifts for the work of the three institutions since the inauguration of the CARNEGIE MAGAZINE in April 1927 to the following amounts: $1,366,422.95 for the Carnegie Institute; $42,629.12 for the Carnegie Library of Pittsburgh; and for the Carnegie Institute of Technology, $230,745.68 for operation and equipment, and for the 1946 Endowment Fund, $1,861,038.82; making a grand total of $3,500,836.57. There is still the sum of $2,138,961.18 to be raised before our obligation with the Carnegie Corporation can be met in 1946.

FOUNDER'S DAY EXHIBITION

THE Founder's Day Exhibition at the Carnegie Institute will be different again this year. These exhibitions, with few exceptions, from 1896 through 1939, were the Carnegie Internationals. As is well known, since 1939 the International has been suspended. In 1940 the Founder's Day show was the Survey of American Painting, and in 1941 Directions in American Painting. In 1942 the Institute presented the American Rooms in Miniature by Mrs. James Ward Thorne as the Founder's Day show. For 1943 the Fine Arts Committee has authorized an Exhibition of Painting in the United States.

There will be from two hundred and fifty to three hundred canvases in the show, all invited by the Institute. Each artist will be asked to send one painting which was completed within the last five years and which has not been previously exhibited in Pittsburgh.

The Carnegie Institute is offering the following prizes: First prize, $1,000; second prize, $700; third prize, $500; first honorable mention, $400; second honorable mention, $300; third honorable mention, $200; fourth honorable mention, $100; popular prize, $200. The prizes will be awarded by a jury of three museum directors, who will meet in Pittsburgh on September 23. All the paintings in the exhibition will be eligible for any of the prizes regardless of any honor which an artist may have achieved in any Carnegie Institute exhibition of paintings.

The exhibition will open on the evening of Founder's Day, which this year will occur on October 14, and it will continue through December 12.

BEVERAGE PLANTS

Some Species Indigenous to Pennsylvania

By LeRoy K. Henry

Assistant Curator, Section of Botany, Carnegie Museum

From time to time the Section of Botany receives requests not only to identify wild plants, but also to specify whether or not they have a household or economic value. With this idea in mind, and in view of the scarcity of coffee and Oriental teas, brought about by the war, I am discussing here some commonly known wild trees, shrubs, and herbs, whose stems, leaves, or roots have been used in the past in the preparation of beverages. I have not tried to drink all of them, but those that I did try have nearly all proved very palatable. It should be stated here, however, that just as some people are allergic to strawberries and get hives from eating them, so might some of these beverages produce a similar physiological effect if taken in too large quantities.

Cherry, Sweet, or Black Birch is a forest tree, attaining a height of seventy to eighty feet and a diameter of two to five feet, with lustrous, reddish-brown, smooth bark on young trunks, branches, and twigs, but becoming very dark and furrowed on old trunks. Its leaves are oblong-oval, tapering to a sharp point and with teethlike margins. It is the inner bark of the growing twigs that has the strongest sweet, spicy wintergreen flavor at all times. The bark from the larger roots, which is easily separated from the wood in spring and early summer, is strongly flavored and when dried it keeps for months without losing much of this savor. It inhabits wood lots and forests from Maine to western Ontario, south to Delaware and Iowa; and in the mountains to Alaska and Tennessee. The young growing twigs or the leaves make a fine tea when steeped in water brought to the boiling point. The Yellow Birch, a larger tree, has a similar range. Its bark has a yellowish tinge and the same wintergreen flavor, but not as pronounced as in the Black Birch.

Wintergreen, Checkerberry, Partridgeberry, Mountain Tea, or Teaberry are a few of the twenty-five common names for a small, creeping shrub best known in this region by the last two names—Mountain Tea or Teaberry. It is commonly found in the woods from Newfoundland to Manitoba, south to Georgia, often in rough mountainous country. Its stems creep upon or beneath the surface of the ground, and from them arise erect branches two to six inches high. The leaves mostly clustered at the ends of the

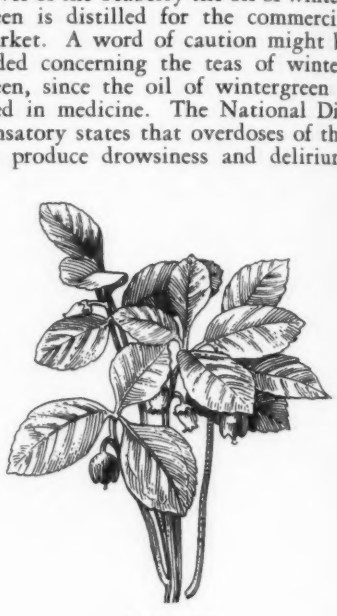
PURPLE AVENS

SWEET BIRCH

branches are leathery, evergreen, and aromatic. Especially when crushed or chewed do they emit the flavor of wintergreen. The mature leaves are dark green and glossy above, paler beneath, while the young leaves are bright green often tinged reddish. The young tender leaves are more strongly flavored than the mature ones. Tea made by steeping the leaves for a few minutes in water brought to the boiling point has a pleasing flavor that I believe could be cultivated by all. It was used as a substitute for tea during the pre-Revolution days.

Creeping Snowberry is a slender branching shrub that grows to a length of three to twelve inches. The leaves are small, oval, and in two ranks on the brownish stem, less than one inch long, pointed, and dark glossy green above, with rolled-in margins. Bell-shaped flowers are borne in the axils of the leaves, from which arise white berries. Both berries and leaves have the aroma of wintergreen. This plant grows in bogs or low mossy woods from Labrador to British Columbia, south to North Carolina, Michigan, and Minnesota. The leaves when steeped in water make a refreshing tea.

The aroma of wintergreen found in these three plants is due to the oil of wintergreen contained in their leaves, stems, and bark. From the twigs and bark of the Sweet Birch and from the leaves of the Teaberry the oil of wintergreen is distilled for the commercial market. A word of caution might be added concerning the teas of wintergreen, since the oil of wintergreen is used in medicine. The National Dispensatory states that overdoses of this oil produce drowsiness and delirium;



TEABERRY

therefore, one should not boil the leaves, but merely steep them in water brought to the boiling point, as in making Oriental tea. Nor should one drink large quantities of the tea at any one time.

Sassafras is generally a small tree found along fence rows, roadsides, and borders of woods from Maine to Michigan and Kansas, south to Florida and Tennessee. The mature tree has thick, rough, reddish-brown bark, broken into flat ridges, while the twigs and young shoots are bright green and mucilaginous. There are three forms of leaves: oval in shape and entire in outline; mitten-shaped—one lobe on the

side; or three-lobed, with the larger lobe in the middle. Appearing with, or just before, the leaves are the greenish-yellow clusters of small flowers. The leaves, twigs, bark, and dark-blue berries have a spicy odor and taste, on which account boys often chew the bark of the twigs. Its roots are rather deep, and send up numerous suckers which form thickets. Commercially the bark of the roots is distilled for the oil, which is used in flavoring medicines, scenting perfumery, and making candy. It is the bark of the root that makes an excellent tea, often drunk by country people in the spring with the belief that it purifies the blood. Whether this is so or not, bundles of the bark are sold in the markets today and a delightful drink and a pleasing change from Oriental tea is made by boiling the bark from fifteen to thirty minutes. Overdosing of the oil, according to the National Dispensatory, causes nausea, collapse, and stupor, but one would have to drink many cups to produce these effects.

Belonging to the same plant family as Sassafras is the Spicebush, a common shrub that grows four to twenty feet high, with smooth, dark bark and slender, brittle twigs. It inhabits rich moist soil in woods or swampy areas from Maine to Michigan, south to Georgia and Tennessee. This plant has a variety of common names, such as Spicewood, Wild Allspice, and Feverbush. The yellow flowers, in small clusters, appear before the oblong or elliptic leaves, which are two to five inches long and two and one-half inches wide, with pointed apex and tapering base. The leaves, twigs, bark, and red berries have a strong aromatic odor and taste. Tea is usually made by boiling a handful of young twigs or branches for at least one-quarter of an hour. It is said that this beverage restores strength. I have tried it and think the tea bitter enough to restore anything. It is said that it was used as a substitute for tea during the Civil War.

STAGHORN SUMAC

SASSAFRAS

The Staghorn Sumac, our largest species, grows to a height of forty feet

and a diameter of nine inches. The dense, velvety hairy covering of the young twigs resembles the new antlers of a stag, whence the name. It has smooth bark, milky juice, and compound leaves composed of from eleven to thirty-one leaflets, with an average of twenty-one. These leaflets are three to five inches long, sharp-pointed with saw-tooth edges, dark green above and pale beneath. Its small yellowish-green flowers are borne in dense terminal clusters. The small berries are covered with crimson hairs and remain on the tree all winter. This plant inhabits dry, gravelly soil from Nova Scotia to South Dakota, south to Georgia, Indiana, and Iowa, and is generally clustered, spreading by root suckers and forming thickets along borders of woods, fences, or old fields. Its fruits are very sour and when soaked in water for a short time produce a pleasing and agreeable drink which boys call "Indian lemonade." The berries are at their best for this use in late summer or early autumn.

The Smooth Sumac is quite similar to the Staghorn in general appearance and in range, but the young twigs are smooth, with a pale bluish or whitish bloom; while the Dwarf Sumac is distinguished by the wing-margined leaf stem on which the leaflets are attached. The berries of both are just as good for making Indian lemonade. This juice, obtained by soaking the berries in water, is sometimes used as a substitute for lemon juice.

A common shrub that grows in dry sandy or gravelly soil in open woods and thickets from Maine to Manitoba, south to Florida and Texas is the New Jersey Tea. Several upright stems arise from the same root cluster to a height of two to three feet. Its leaves are arranged alternately on the stem, strongly three-ribbed, and two to three inches long, with pointed apex and saw-tooth edges. About the first of June, small, white flowers appear in dense clusters on the end of the branches. These leaves were used as a substitute for tea during the American Revolution. In order to make the tea, the dried leaves are steeped in water brought to the boiling point. Green leaves may be used also, but dried ones are better, and sugar improves the flavor. To me, the tea made from the dried leaves tastes very similar to that of Oriental green teas.

CHICORY

An evergreen shrub that grows from one to three feet high, with densely woolly twigs is the Labrador Tea. Its leaves are one to two inches long, thick, leathery, oblong with rolled-in margins, dark green above and covered with brown wool beneath. These leaves are fragrant when crushed. White flowers clustered on ends of twigs appear in early summer. The plants inhabit swamps, bogs, and damp woods from Greenland and Labrador, southwest to Connecticut, Pennsylvania, Michigan, Minnesota, and Washington. In the north it is more common than in the southern part of its range, where it is confined chiefly to mountain swamps and bogs. It is said to have been used as tea during Revolutionary days and to have a slight aroma and taste somewhat like Oriental tea. The leaves contain considerable tan-

SPEARMINT GOLDENROD NEW JERSEY TEA

nin and some narcotic, but it is claimed that the poisonous andromedotoxin, often present in leaves of plants belonging to this family, is wanting. However, one should not drink more than a cup of this tea at a time.

Spearmint, a native of Europe and Asia, was introduced here over two hundred years ago and is now well established. It inhabits stream banks and wet places from Nova Scotia to Washington, south to Florida, Texas, and California. These plants grow from one to two feet tall from creeping roots. The leaves are sessile, toothed, sharp at apex, narrowed at base, while the pale purple flowers are borne in whorled, terminal, interrupted spikes. Commercially the oil is distilled and used for flavoring gum and candy, while sprigs of it are used for making mint julep and mint jelly. The dried leaves when steeped in water make a delicious tea.

Peppermint is another native of the old world that has become widespread here. Its growth habits are similar to that of Spearmint, and it is cultivated for its pungent oil, which is used in flavoring candy. Tea made from the dried leaves is usually too strong for most tastes.

The only one of the fifty or more species of Goldenrod found in our northeastern States that has fragrance of anise is the Sweet Goldenrod. Ranging from Maine and Vermont, south to Florida and west to Missouri and Texas, it grows in fertile but dry or sandy soil along borders of thickets, in open woods, or on sunny hillsides. These plants are two to three feet high, with lance-shaped leaves, two to four inches long and about one-half as wide, sessile, sharp pointed, with entire margins and a prominent mid-vein. Spreading yellow flowers, in one-sided clusters, appear from July to September. The fragrant leaves, when dried and steeped in water, form a pleasing drink. It is also re-

corded that the dried flowers make a wholesome tea substitute.

The Sweet Fern is a shrub, one to two feet tall with fernlike leaves which when crushed have a sweet fragrance. It grows in dry wooded hillsides or in neglected fields from Nova Scotia to Saskatchewan, south to North Carolina and Indiana. The leaves are reported to have been dried and used for tea during the Revolutionary War.

A common name for one of the deciduous leaved hollies is Black Alder, a shrub six to twenty-five feet tall that inhabits swampy or wet places from Nova Scotia to Wisconsin, south to Florida and Missouri. The leaves are thick, oval or oblong, two to three inches long and about one inch wide, with pointed tip and sharply cut edges; while the clustered fruit is bright red. These leaves have been used as a substitute for Oriental tea.

Another holly, Evergreen Winterberry, grows from Nova Scotia to Florida and Louisiana, mainly near the coast. It is a shrub two to six feet high with leathery dark green, evergreen, elliptical leaves which have a few teeth at the apex or are entire; while the fruit is solitary in the axils of the leaves. The dried leaves are used as a substitute for Paraguay tea, which is made from leaves of a holly native to South America.

Purple or Water Avens is a perennial herb found in swamps or wet ground from Newfoundland to New York, west to Alberta and Colorado. Its basal leaves are compound, with three segments at the top and several small ones along the side; while the stem leaves are single or three foliate. The purplish flowers, about one inch across, nod from the tips of the stems. The root is used in making a beverage that is a substitute for cocoa.

Chicory is a native of Europe and Asia that has escaped to North America, where it has become a weed in pastures and along roadsides from Nova Scotia to Minnesota, south to Florida and Kentucky. This stiff, branching, perennial herb, with a deep taproot, grows one to three feet tall from a rosette of basal leaves that are three to six inches long, with cut, lobed, or toothed edges. The stem leaves are very small and the flowers borne in heads, singly or clustered, are a beautiful blue color. The roots of this plant are roasted, ground, and used as a substitute or adulterant of coffee.

This group of beverage plants is by no means exhaustive, but includes particularly those found in Pennsylvania. Many plants native to other regions, such as the Kentucky Coffeetree, have similar uses.

The United States normally imports around 100,000,000 pounds of tea a year from seven chief sources. According to information recently released, this amount will be cut this year to 50,000,000 pounds, which will come from the only two sources left to the United Nations—India and Ceylon—and will be our allotment for the months from April 1943 to April 1944. In addition, 15,000,000 pounds will be allocated to the armed forces.

Various kinds of herbal teas were popular in many lands long before the English traders brought the tea we now use out of the Orient to trade in different parts of the world. In our own country, herbal brews called "Liberty teas" were cultivated in many colonial towns during the boycott of British tea preceding the Revolutionary War. Colonial newspapers suggested home substitutes, including everything from sweet marjoram to ground ivy. And during the Civil War, sweet-potato-leaf tea was very popular in the South.

Now, as in those other times, it would be possible to find your own favorite tea source among the dozen or more plants I have mentioned.

INIQUITY OF WAR

For it would have been better that man should have been born dumb, nay, void of all reason, rather than that he should employ the gifts of Providence to the destruction of his neighbor.

—QUINTILLIAN

"THE PLAY'S THE THING"

Reviewing Chekhov's "The Three Sisters"

By Austin Wright

Assistant Professor, Department of English
Carnegie Institute of Technology

In the library of the Carnegie Institute of Technology is a series of carefully treasured theses prepared over a period of years by seniors in the department of drama. Each thesis is a complete and colorful record of a single production given in the Little Theater, and an examination of any one of them reveals something of the tremendous amount of care and patience and painstaking effort that goes into a dramatic production at Tech. Beginning with a history of notable productions of the play under discussion, a thesis includes a complete promptbook with detailed notes upon interpretation and action, drawings of the sets, numerous photographs of scenes from the play, a description of lighting procedure, a time sheet, a property list, and colored costume plates. In recent years a new system of senior thesis requirements has been instituted, and what is perhaps an even fuller record of each production is now compiled by the student stage manager, and bound and preserved in the library. These interesting volumes testify that the budding actors and actresses at Tech enjoy an almost unparalleled opportunity to acquire through study and practice the varied lore of the theater—an understanding of every phase of that fascinating profession from the humble wielding of the hammer or brush to the skilful portrayal of a Portia or a Hamlet.

Among the theses is one by Sara Scott describing the production of "The Three Sisters" in January 1936. This was the third full-length play by Chekhov to be staged by the department of drama: "The Cherry Orchard" had been produced two years earlier, and in 1932 the freshman class had presented "The Sea Gull." I did not see the 1932 production, but the others live in my memory as two of the most successful offerings at the Little Theater within my experience. The production of "The Three Sisters" remains especially vivid, and I find that I recall with pleasure many details of it.

Like all of Chekhov's plays, "The Three Sisters" is largely lacking in action, movement, plot. Chekhov makes no attempt to emulate the writers of "the well-made play." Always his purpose is simply to give a realistic picture of certain people wearing out their days and years in the humdrum, eventless fashion of ordinary life. And in "The Three Sisters" the essential dullness is deliberately increased by his purpose of conveying a sense of disappointment and futility. It is a tragedy of frustration. And a play which is intended to suggest the boredom of a banal and petty existence would be a failure if it were anything but dull. Chekhov himself wrote of it, "The play turned out dull, verbose, and awkward." The dullness, however, is somehow fascinating, and as one views the four slow, uneventful acts one realizes that the author has achieved exactly what he tried to achieve, and that no one who sees the play will ever quite forget the impression it creates.

The desperate desire of the heroines to go to Moscow is used symbolically to suggest the multitudinous, sometimes half-formed longings which burn in most human hearts and are seldom fulfilled; this is why one reviewer of the Katharine Cornell production who sneered at the idea that it should take the girls "four acts not to get to Moscow" was simply making a wise-crack. Chekhov knew that all people have their Moscow and that few ever attain it, and his purpose was to portray sympathetically the manner in which people slowly realize that the swift years are passing, that they are growing old, that their future is not a romantic kaleidoscope of gay colors but merely a continuation of the drab present. "My life passed me by like a sheet of lightning," marvels Chebutykin. And Irina sobs, "Where has everything gone? Where is it all? Life is slipping away and will never return, and we'll never, never go to Moscow—I see that we'll never go." But perhaps the saddest realization of all is that even if human beings achieved what they think they want, they would still not be happy. Vershinin, who is apparently Chekhov's spokesman, tells of the prison diary of a French minister involved in a political scandal: "With what enthusiasm and delight he describes the birds he sees from the prison window, which he never noticed before when he was a minister. Now that he is released, of course he notices birds no more than he did before. In the same way, you won't notice Moscow when you live in it. We have no happiness and never shall have; we only long for it." Many years earlier Carlyle had spoken in much the same vein about man's infinite longing and inevitable disappointment, and in Chekhov's sensitive play we see the tragedy of human frustration and boundless regret portrayed in the broken lives of characters with whom, for all their impracticality and lack of direction, we come to sympathize intensely. Hence, to see this play well performed is a stirring and memorable experience for theatergoers.

Last winter Katharine Cornell brought to Broadway a new production of "The Three Sisters," and after a highly successful New York run the play was taken on a tour which fortunately included a week's engagement at the Nixon Theater in Pittsburgh in mid-May. Miss Cornell deserves the gratitude and praise of theater-lovers for providing them with such a brilliant production and with such a star-filled cast. The play was easily the highlight of a mediocre season at the Nixon, and so superior to most dramatic entertainment that to find fault with it savors of ingratitude; yet in frankness I must report that in some respects the production was disappointing.

Though it has become a commonplace for Pittsburghers to complain that New York casts playing at the Nixon do not make themselves heard, the criticism should be reiterated until the defect is remedied. I am sufficiently simple—and obstinate—to feel that no matter how brilliant the acting, the primary purpose of actors is to speak an author's lines so that an audience may understand them and hence follow the thought. Is this too much to expect? True, I did not lose many lines on this occasion—but one should not be forced to lose any. Ruth Gordon in the first two scenes and Tom Powers throughout the play were the principal offenders in this respect.

Then, Judith Anderson as Olga, Miss Cornell as Masha, and Miss Gordon as Natasha, though all are of course excellent actresses, were not ideally cast. When the play opens, Olga is still a young woman of twenty-eight who struggles against the fate which denies her all opportunity for romance and marriage and drives her into the anxious, exhausting, youth-stealing life of headmistress of a school for girls; Masha, who was married at eighteen to a man many years her senior, is now only twenty-two, an essentially inexperienced girl who is suddenly ma-

tured by her love for Vershinin; and Natasha is a naïve child whose chief weapon in capturing Andrey is the fresh physical charm of youth. But in the hands of Miss Anderson and Miss Cornell the tragedy of Olga and Masha became the tragedy of middle-aged women and lost in poignancy what is gained through skilful acting, while Miss Gordon's Natasha seemed far too mature, not only in the opening scene, but throughout the entire limit of the play.

THE THREE SISTERS
Left to right: Gertrude Musgrove (Irina)
Judith Anderson (Olga), Katharine Cornell (Masha)

Again, whereas the relationship between Masha and Vershinin is intended to be the most moving and tragic element in the story, I realized as the curtain fell that somehow the proper effect had not been obtained. One felt more sympathy for Irina and the Baron than for Masha and Vershinin. The role of Masha is a comparatively small one for Miss Cornell, and also very difficult, but I expected this splendid actress to get more out of it than she did. I have greatly admired her work in "The Doctor's Dilemma," "Romeo and Juliet," "The Barretts of Wimpole Street," "Saint Joan," and even such inferior plays as "The Green Hat," "Dishonored Lady," and "The Wingless Victory," but for the first time I found her disappointing. Languid, cold, obviously aiming at the effect of "laughter through tears," her Masha was faintly annoying and was rescued from insignificance only by the thrilling voice and strange beauty of the actress. Dennis King was a handsome, masculine Vershinin, but again there was something lacking which made his scenes with Masha ordinary rather than moving.

One final criticism: Guthrie McClintic, whose staging was for the most part shrewd and skilful, seems to have taken puzzling liberties with the text, particularly in the final act. Chekhov is fond of heightening his effects by the subtle use of music, and in "The Three Sisters" he has two strolling musicians wander on to the stage and play softly. In the Tech production of 1936 these musicians were a pretty gypsy girl who played the violin and a young man who sang with a lovely tenor voice, and the music heightened immeasurably the mood of regret and melancholy which pervades this scene. Mr. McClintic deleted the incident entirely. In the same scene Andrey has an excellent speech which epitomizes his disappointment in his own career and his disgust at the conditions of human life. It is a tragic speech which seems to me of central importance—but Mr. McClintic deleted it. At the very end of the play, after Vershinin has departed and Irina has just learned of the Baron's death, old Chebutykin is supposed to sit at the back of the stage and pull out his crumpled newspaper, and as Olga makes her impassioned final speech he sings softly and mutters, "It's all the same! It's all the same!" This little incident

increases the tragic effect of the shattering blows which have destroyed the happiness of the sisters—but Mr. McClintic, apparently for the purpose of centering attention upon the sisters, unwisely deleted it.

In spite of faults, however, Miss Cornell's version of Chekhov was a masterful, memorable production and one which I am happy to have witnessed. The play has been called an actors' paradise, and the accomplished players with whom Miss Cornell courageously and extravagantly surrounded herself gave a sensitive, sympathetic performance. Outstanding in the expert cast were Edmund Gwenn as Chebutykin and Gertrude Musgrove as Irina. Mr. Gwenn's every word and every gesture were just right, and his magnificent playing of his drunken scene was only the climax of a consistently skilful performance. Miss Musgrove was a pleasant surprise in a cast dotted with the names of more famous actresses: she made Irina vastly appealing, and her quiet beauty and the pathetic relationship between the Baron and herself gave the play much of its charm. Miss Anderson performed movingly as Olga, and though I thought that Miss Gordon overplayed Natasha, she was undeniably powerful as a scheming, stupid, ruthless hussy. I liked particularly her portrayal of the smug, tiresome egotism of triumphant motherhood. Alice BelmoreCliffe played superbly the small role of Anfisa.

Alexander Knox was satisfactory as the Baron. His presentation of a warmhearted, likeable, meditative idler who cannot quite make people take him seriously was a good piece of acting. I enjoyed his reading of the speech in which he likens the lives of men and women to those of migratory cranes. Joseph Wiseman was a good-looking Andrey who succeeded in holding audience sympathy in spite of his spineless submission to Natasha—and in spite of the loss of one of his best speeches! Tom Powers, except for his light voice, was nearly perfect as Kuligin, the uxorious schoolmaster who is not really absurd but simply tiresome, a pedant, and unlucky with women. McKay Morris was splendid in the difficult role of Solyony, that shy, self-conscious, unhappy man whom the audience must be made to sympathize with in spite of his boorishness and his brutal crime of destroying Irina's last chance for happiness.

On the whole, this production of "The Three Sisters" was a triumph for Miss Cornell the producer if not for Miss Cornell the actress, and if it had its weaknesses, if it was not so superlatively good as to discourage other producers from staging the play again within our time, it was nevertheless a noble experiment and a gratifying sign of the increasing maturity of the American theater.

JACOPO DELLA QUERCIA

THE sculptor of the tomb-monument of Ilaria del Carretto in the Hall of Architecture of the Carnegie Institute was Jacopo della Quercia (1374-1438) so named from a castle, Quercia Grossa, near his birthplace, a small market town in the neighborhood of Siena. His father, who was called Master Pietro d'Angelo, was a goldsmith who educated his son in that same art so that he might help him in his trade. Jacopo, however, possessed an independently inquiring and aspiring mind, and wished to be a sculptor. He is the first of the Tuscan masters; and the tomb of Ilaria, second wife of Paolo Guinigi, lord of the city of Lucca, is considered one of his most important pieces.

POWER OF MUSIC

Music has something to say to everyone, and every man, woman, and child hears a different message, even when listening to the same music, because we all think and feel differently. Some like to shut out the visual by closing their eyes. Others see inner visions of great beauty while listening to music. To some, music is intellectual —to others, it is emotional. To some, a whole new world of imagination opens up through music.

—LEOPOLD STOKOWSKI

WHY HATE ENGLAND?

A PITTSBURGH man of German birth was recently punished by the court for sedition for writing to newly enlisted soldiers, among other treasonable statements, that they were going out to fight for the maintenance of the British Empire. And this assertion is kept uppermost in the propaganda which Germany is constantly disseminating among our people. "God! How I hate England!" is a favorite phrase of another man, rather prominent in business, who is careful not to go beyond the lawful expression of this opinion. There are undoubtedly many other persons in this country who either carelessly or with malicious intent make it their business to sow the seeds of bitter enmity and hatred against our mother country.

For a study of population will show that England is our mother country. In the American Revolution, at the time of the adoption of the Constitution, when the aggressions of a German king in England had made it intolerable to maintain the political connections of the American colonies with the Homeland, the white population of the thirteen colonies, as we learn from James Truslow Adams' "Dictionary of American History," was 2,776,000 persons. Of this total, Mr. Adams says that a full seventy-five per cent were of straight English stock, while more than half of the balance were from other parts of the British Isles, mostly Scots, including the transplanted Scots of Ulster, known as Scotch-Irish, who originally were of English stock. Thus the brave people who created the United States of America were at that time ninety per cent British in origin.

The policy of the Hanoverian monarch, George III, and of his pliable minister, Lord North, had been persistently opposed by substantially the whole power of the brain and conscience of the people of England. Their greatest statesmen, Pitt, Fox, Burke, and Sheridan, made the rafters of Parliament ring with their eloquent denunciations of the unbroken tyranny of the crown. Pittsburgh is named for Pitt, and his statue holds a prominent place in our hall of fame. Burke's "Speech on Conciliation with America" is esteemed by many critics as the greatest oration of modern times; and when King George was building his armies for the brutal conquest of his American people, he found it necessary to send the German mercenary regiments overseas because so many of his English troops would not go.

When the census bureau made its scientific study of our population in order to implement the national origins clause of the Immigration Act of 1924, it was estimated that 49.9 per cent of all the white blood in America is of the old colonial stock; and the census of 1930 claimed that this colonial stock at that time amounted to 54,000,000 persons. This does not mean that we have that many people of unmixed

colonial descent. It does mean, however, that colonial blood strongly leavens every part of our country, while in certain sections, notably the South, and in large parts of the West, the population is almost wholly descended from colonial strains.

There are many practical reasons for cherishing these facts which lie at the beginnings of our national history. If, for example, England had surrendered to Hitler when France fell, the United States would have been fighting this great war alone, probably with Russia in a neutral position. Moreover, everything that we are now fighting for is grouped in that deposit of liberty of more than a thousand years of growth, starting from King Alfred, which we have received from England. Besides, in language, literature, and law our culture is derived from England.

It should not be neglected to say that other peoples have come into our hospitable land from feudal Europe, chief among whom are some twelve millions from Germany. This movement had its heaviest immigration in 1848, when a revolution for liberty that was made in Germany failed, and thousands of families took their flight to this country, inspired by a double motive of seeking safety from ruthless execution and finding a new home here in security and peace. No finer people ever lived than these freedom-seeking Germans, now loyal Americans, who have added an inestimable treasure to the morals and intellect and religion of the national conscience of America.

WHY DO WARS COME?

Wars come at all times from one of two causes: First, and mainly, from the aggressions of ambitious leaders; or, secondly, from revolutionary instincts, or civil wars.

Wars never come from economic want—economic want invariably comes from wars. Yet, in the discussions of the approaching peace it is amazing to find so many men, who are supposed to be clear thinkers, asserting the opinion that all wars, and especially this war, have their outbreak from the failure of the aggressor nation to find a convenient access to raw materials. In fact, many colleges throughout the country are teaching this fallacy to their receptive students. But a review of the facts will show that all nations, in times of peace, find themselves free to use raw materials without any restriction, exactly as if they were the owners of these natural deposits. And in this situation the world strives for happiness. Probably no country has felt the urge of a constant importation of goods foreign to its own soil so much as has the United States; yet the United States has never declared nor threatened war in order to obtain these goods. The comity of intercourse existing in peace between all nations opens up the access to all of them for common sources of supply; and it is only in times of war, as we find at this instant, that we are shut off entirely from the accustomed interchange of our productions for rubber, silk, tin, and a hundred other commodities, which in ordinary circumstances we take from other countries and use with the freedom of ownership. But economic want has no influence upon the question, because of the univeral freedom of the exchange of goods.

Putting civil wars aside as local events occurring in the development of civil life, we find the main cause of wars from the most ancient time down to our own day to come from ambitious warriors who are bent solely on aggression for the expansion of power and territory.

Hannibal was possibly the greatest general of his age, and he developed his power in arms in order to defeat Rome in her determination to overthrow Carthage. The aggressor in that case was Rome. Julius Caesar undertook the conquest of Gaul to spread the majesty of the Roman Empire, and for that cause alone. If Hannibal had won the deliverance of Carthage, or if

Vercingetorix had prevailed on that day when Caesar, in his toughest fight, "overcame the Nervii," Rome would have shrunk in the first century to the smaller dimensions to which she was reduced in the fifth century.

The Germans made themselves known as treacherous neighbors when, after the assassination of Caesar, they destroyed the legions of Varus; and many centuries later Marshal Petain made the comment at his own dinner table in Paris, in the hearing of this writer, that from Julius Caesar's time up to that evening the Germans had attacked France seventy-two times. When Charlemagne undertook his great work of pacifying continental Europe in 800, he discovered, as we are told by his history-writing secretary Eginhard, that the North Germans, alone of all the races of Europe, tenaciously retained their savage habits, committed atrocities, slaughtered hostages, and broke treaties without regard to honor or truth.

Charles V of Spain was esteemed the greatest sovereign of the sixteenth century, and he wore that title of "greatest" because he subdued the four kingdoms of Aragon, Castile, Austria, and Burgundy, only to find that he was a robber and a destroyer, and that while countries might be overrun, the souls of their people are unconquerable and they are bound to resume their freedom. And the abdication of Charles followed his discovery of this truth.

The Hundred Years War (1337-1453) aside from almost constant local quarrels, was fought between England and France really to determine whether, at the Norman Conquest, William had annexed France to England. At the end of that long century of strife it was found that he had not done so.

Japan attacked China in 1936 because Japan had engaged herself in a war to spread her hegemony throughout Asia. Italy attacked Ethiopia about the same time in order to increase the domains of her empire in Africa. And Germany made this war in a mad dream that she could become the master of the world.

It is greatly to the credit of the loyalty and intelligence of the American people that many thousands of them are contributing their ideas as to what should be done in establishing peace to make that peace a permanent one. As a matter of historic fact, they all charge Germany with the sole responsibility for the World War and this war; and beyond these inexpiable crimes there is an unbreakable opinion, not only in America but throughout the civilized world, that the instinct of power and aggression has taken so deep a root in the mind of the German people that unless that nation is disarmed and controlled by a sufficient police power, further wars will simply await the preparation of time.

But out of this commendable and stimulating thinking certain propositions are being advanced by respected groups and societies devoted to the crushing of the war instinct in Germany, which, however, really promise to promote the encroachments of Germany and make wars worldwide, permanent, and inevitable. The most objectionable of all these palliatives is the proposal, seriously and in good faith pressed forward in letters to the newspapers and in public addresses, that the teaching in schools and colleges throughout Germany shall be dictated, established, and enforced by the United Nations. What this means is, simply, that the great German nation shall be subjected to a foreign and intolerable system of education, restoring the obnoxious system of carpetbagging with which the North oppressed the South at the end of our Civil War.

The nations who have made this war, and the last one, should be put in strait jackets and kept under the hand of authority until aggression and murder have been driven out of their hearts. In the meantime, the economic want which this war has engendered, and which did not exist before its outbreak, should be cared for in the sheltering arms of humanity.

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